

REMARKS

In the amendments above, Claims 1, 17, and 20 have been amended to more particularly point out and distinctly claim Applicant's invention. Also, the specification has been amended to delete the language to which the Examiner objected.

The Examiner has objected to the drawings. Applicant respectfully submits that the embodiments of the invention set forth in Figures 1 and 2 represent the invention as set forth in, for example, Claims 1 and 17. For example, at the last full paragraph of page 5, reference to the "visualization, recognition and placement apparatus" is consistent with the pick and place machine claim. Moreover, a close reading of, for example, the description of Figures 1 and 2 in pages 6 to 8, appears to support the elements of the method and apparatus claimed. Applicant respectfully requests that this objection be withdrawn.

Claim 20 and then Claims 17 to 20 have been rejected under 35 U.S.C. § 112, first paragraph. The Examiner's attention is directed to the amendments above, wherein the amendments to Claims 17 and 20 are believed to overcome the basis of these rejections.

Claims 1 to 4 and 7 to 10 have been rejected under 35 U.S.C. § 102 as being unpatentable over Ninomiya et al., U.S. Patent No. 5,459,794. The Examiner maintains that Ninomiya teaches a method of visualization of a part 14 having metallic objects against a "light" colored non-metallic background comprising illuminating the part with electromagnetic radiation that is linearly polarized in a predetermined first direction, and forming an image S1 of electromagnetic radiation reflected from the part viewed through a linearly polarization filter oriented for passing electromagnetic radiation that is linearly polarized in a second direction that is substantially orthogonal to the first direction, whereby in the formed image, an enhanced contrast between the metallic objects and the background is produced; that with regard to Claim 2, Ninomiya teaches recognizing the metallic objects in the formed image; that with regard to Claim 3, Ninomiya teaches the electromagnetic radiation is light, and the image is formed by a camera; that with regard

to Claim 4, Ninomiya teaches the electromagnetic radiation is light, the image is formed by a camera of a computer vision system, and said recognizing is performed by the computer vision system; that with regard to Claim 7, Ninomiya teaches an apparatus for visualization of a part having metallic objects against a "light" colored non-metallic background comprising: one or more sources for illuminating the part with electromagnetic radiation that is linearly polarized (11 and 12), at least one of the sources producing electromagnetic radiation that is linearly polarized in a predetermined first direction, and an image forming device 16 for forming an image of electromagnetic radiation reflected from the part viewed through a linearly polarization filter 15 oriented for passing electromagnetic radiation that is linearly polarized in a second direction that is substantially orthogonal to the first direction, whereby in the formed image, an enhanced contrast between the metallic objects and the background is produced; that with regard to Claim 8, Ninomiya teaches a computer vision system for recognizing the metallic objects in the formed image; that with regard to Claim 9, Ninomiya teaches the electromagnetic radiation is light, and the image forming device is a camera; and that with regard to Claim 10, Ninomiya teaches the electromagnetic radiation is light, and the image forming device is a camera of the computer vision system.

Applicant respectfully traverses this rejection.

It should be noted that Ninomiya teaches measuring the sizes of circuits within an integrated circuit chip. Ninomiya fails to teach the "Surface Mount Tool" or "Pick and Place Machine" as claimed in the present invention which recognizes, inspects and automatically places surface mount components. Rather, Ninomiya merely teaches the measurement of features within an integrated circuit chip and fails to mention using such visualization techniques to identify parts and place those parts.

More particularly Ninomiya fails to teach or suggest "Pick and Place Machine" or "Surface Mount Tool" inventions recited in independent Claims 1, 7 and 17. Additionally, one would not necessarily apply the teachings of IC fabrication to surface

mount technology, which differ by several orders of magnitude. Thus, it is improper to apply the teachings of Ninomiya in this instance.

Claims 2-4 and 8-10 depend from independent Claims 1 and 7, and are patentably distinct as a further limitations upon independent Claims 1 and 7. As such, Applicant respectfully requests the Examiner withdraw the rejections and allow Claims 1 to 4 and 7 to 10.

Claim 13 has been rejected under 35 U.S.C. § 103 as being unpatentable over Ninomiya, and Claims 5, 6, 11, 12 and 14 have been rejected under 35 U.S.C. § 103 as being unpatentable over Ninomiya et al. in view of Ludlow et al., U.S. Patent No. 6,201,892 ("Ludlow"). The Examiner maintains that with regard to Claim 13, Ninomiya does not explicitly teach such a manipulator; that, however, the use of pick-and-place machines for this purpose is well known in the art; that therefore, it would have been obvious to one of ordinary skill in the art to use the inspection apparatus of Ninomiya with a pick and place machine as recited in Claim 13, as the use of pick-and-place machines are well known in the art, in order to eliminate the manual labor involved in placing parts if assembled products; that with regard to Claims 5, 6, 11, and 12, Ninomiya does teach the background being a ceramic (i.e., a dielectric); that Ninomiya does not teach a ball grid array; that however, Ludlow teaches using a light imaging inspection system for inspecting a ball grid array; that therefore, it would have been obvious to one of ordinary skill in the art to use the device or method of Ninomiya with a ball grid array as taught in Ludlow, as the inspection of BGAs is well [sic] known in the art as shown by Ludlow, in order to provide for a common type of specimen in the device of Ninomiya; and that with regard to Claim 14, Ninomiya does not explicitly teach such a manipulator; that however, the use of pick-and-place machines for this purpose is well known in the art; and that therefore, it would have been obvious to one of ordinary skill in the art to use the inspection apparatus of Ninomiya with a pick and place machine as recited in Claim 14, as the use of pick-and-place machines are well known in the art, in order to eliminate the manual labor involved in placing parts if assembled products.

Applicant respectfully traverses the above rejections.

First, it is again pointed out that to combine references for an obviousness rejection, there must be some teaching, suggestion or incentives supporting the combination. In re Laskowski, 871 F.2d 115, 117, 10 U.S.P.Q. 2d 1397, 1399 (Fed. Cir. 1989). The mere fact that the prior art could be modified does not make that modification obvious unless the prior art suggests the desirability of the modification. In re Gordon, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984). In addition, it is well established that Applicant's disclosure cannot be used to reconstruct Applicant's invention from individual pieces found in separate, isolated references. In re Fine, 837 F.2d 1071, 5 U.S.P.Q. 2d 1596 (Fed. Cir. 1988).

Applicant again submits that there is no motivation, teaching or suggestion to combine Ninomiya with Ludlow. Therefore, any rejection upon a combination of these references is inappropriate. Withdrawal of the rejection and allowance of Claims 5, 6, and 11 to 14 are respectfully requested.

It is further submitted that neither Ninomiya or Ludlow alone nor the combination of the two teaches or suggests the "Pick and Place Machine" or "Surface Mount Tool" recited in Claim 1, 7, and 17. Ninomiya merely teaches the measurement of circuits within an integrated circuit chip, while Ludlow merely teaches an inspection system used to determine the need for reworking an object. Furthermore, Ludlow requires the inspected objects to be illuminated twice and that multiple images are combined. These combined images enhance the visibility of "reflective features being inspected on the object" (Ludlow, Column 17, lines 42-45). In either case, the prior art fails to teach Applicant's invention by far, as both references fail to teach a "pick and place machine." Furthermore, it is appropriate not to apply the teachings of IC manufacturing and manual inspection techniques to automated printed circuit board assembly.

For the reasons above, Applicant respectfully requests the Examiner to reconsider and withdraw the rejection of Claim 5, 6, and 11-14.

Claims 17 to 20 have been rejected under 35 U.C.C. § 103(a) as being unpatentable over Ninomiya in view of Fishbaine et al. U.S. Patent No. 6,538,750 ("Fishbaine"). The Examiner maintains that with regard to Claims 17 and 20, Ninomiya teaches an apparatus for visualization of a part having metallic objects against a non-metallic background comprising: one or more sources for illuminating the part with electromagnetic radiation that is linearly polarized (11 and 12), at least one of the sources producing electromagnetic radiation that is linearly polarized in a predetermined first direction, and an image forming device 16 for forming an image of electromagnetic radiation reflected from the part viewed through a linear polarization filter 15 oriented for passing electromagnetic radiation that is linearly polarized in a second direction that is substantially orthogonal to the first direction, whereby in the formed image, an enhanced contrast between the metallic objects and the background is produced; that further with regard to Claim 17, Ninomiya does not explicitly teach such a manipulator or control system; that, however, the use of pick-and-place machines which includes manipulators, control systems, and part inspection are well known in the art as shown by Fishbaine et al.; that, therefore, it would have been obvious to one of ordinary skill in the art to use the inspection apparatus of Ninomiya with a pick and place machine as recited in Claim 14, as the use of pick-and-place machines are well known in the art, in order to eliminate the manual labor involved in placing parts in assembled products; that with regard to Claim 18, the modified device of Ninomiya teaches picking and placing components; that the modified device further teaches inspecting prior to placement and discarding unwanted/faulty pieces; and that with regard to Claim 19, the modified device of Ninomiya teaches a circuit board.

Applicant respectfully traverses the above rejection, which is ineffective for at least three reasons: First, as discussed above, Ninomiya itself is inapplicable against the invention claimed in at least Claim 17. Second, for the same reasons set forth above, it is inappropriate to combine the Ninomiya and Fishbaine patents. And third, even if

Ninomiya and Fishbaine were combined, they do not teach or suggest the aspects of the invention set forth in Claims 17 to 20.

Applicant submits that the amendments and comments above are indicated to reduce issues and to generate new issues or otherwise require further searching or consideration on the Examiner's part. Therefore, entry of this amendment is believed proper.

Respectfully Submitted,

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